Northern Everglades Initiative Update

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Water Resources Advisory Commission
September 6, 2007

Lake Okeechobee Technical Plan Requirements

- **Identify facilities to achieve TMDL**
  - **Size**
  - **Location**
  - **Schedule**
  - **Budget**
  - **Costs**
- **Provide additional measures to increase water storage and reduce excess water levels in lake and discharges to tide**
  - **Identify storage goal to achieve desired lake levels and inflow volumes to estuaries while meeting other water related needs**

Phase II Technical Plan
Lake Okeechobee Watershed

Objectives

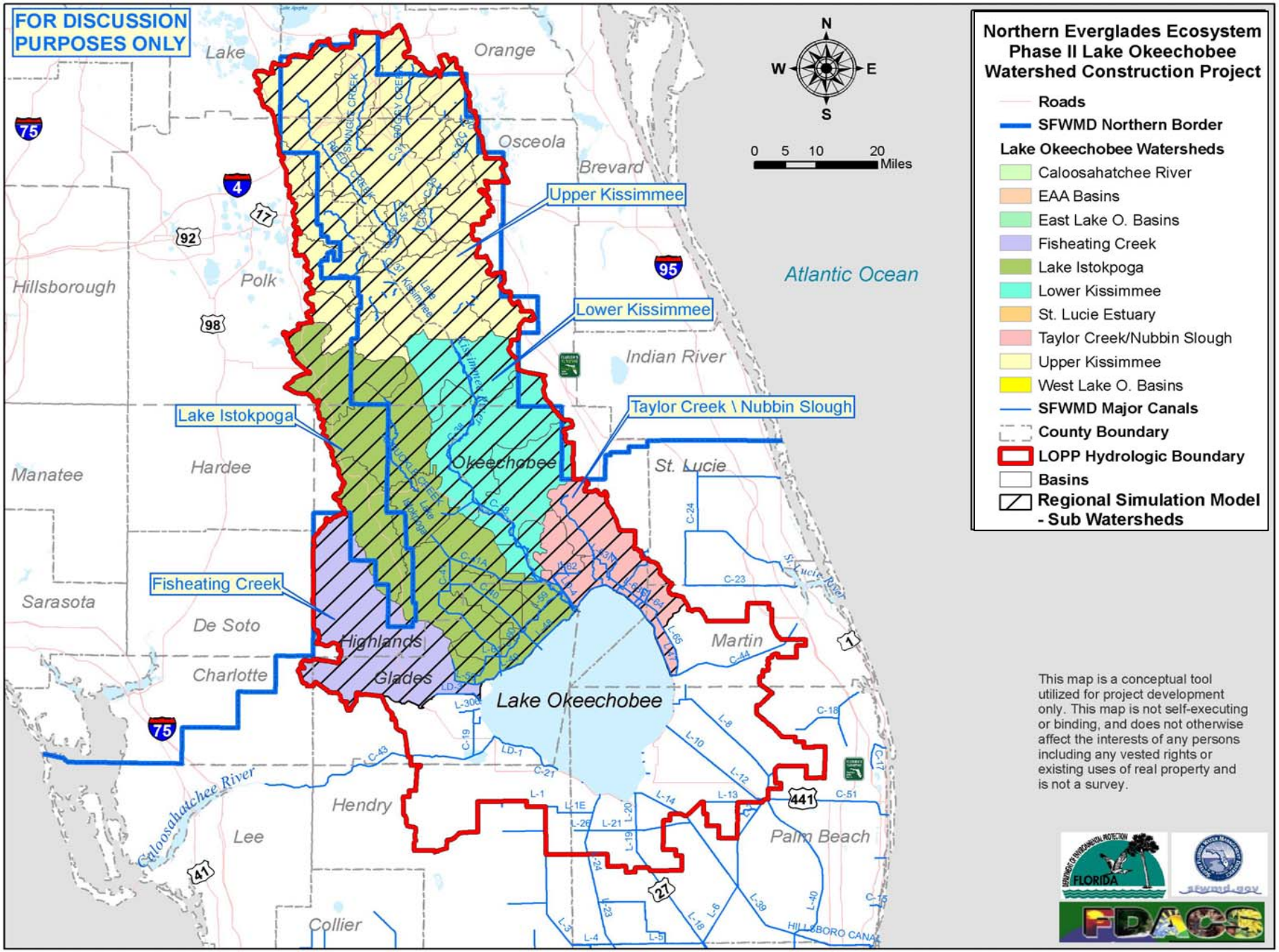
- **Meet Lake Okeechobee Watershed Total Maximum Daily Loads**
- **Manage Lake Okeechobee levels within an ecologically desirable range**
- **Manage flows to meet desirable salinity ranges for the St. Lucie and Caloosahatchee Estuaries**
- **Identify opportunities for alternative surface water supply sources in the watershed**

Water Quality and Quantity Analyses

- **Water Quantity**
  - **Water Budget analysis using Regional Simulation Model**
- **Water Quality**
  - **Spreadsheet evaluation of phosphorus reduction**
  - **Builds upon 2007 Lake Okeechobee Protection Plan Update**

Water Quantity Analysis

- **Water Budget analysis using Regional Simulation Model.**
- **Area north of Lake Okeechobee subdivided into 5 sub-watersheds**
  - **Upper Kissimmee**
  - **Lower Kissimmee**
  - **Lake Istokpoga**
  - **Fisheating Creek**
  - **Taylor Creek/Nubbin Slough**
- **Management measures with affect on water budget such as reservoirs or STAs are generally simulated as one facility per sub-watershed**


FOR DISCUSSION PURPOSES ONLY
Northern Everglades Ecosystem Phase II Lake Okeechobee Watershed Construction Project
Roads
SFWMD Northern Border
Lake Okeechobee Watersheds
Caloosahatchee River
EAA Basins
East Lake O. Basins
Fisheating Creek
Lake Istokpoga
Lower Kissimmee
St. Lucie Estuary
Taylor Creek/Nubbin Slough
Upper Kissimmee
West Lake O. Basins
SFWMD Major Canals
County Boundary
LOPP Hydrologic Boundary
Basins
Regional Simulation Model - Sub Watersheds
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Upper Kissimmee
Lower Kissimmee
Lake Istokpoga
Taylor Creek \ Nubbin Slough
Fisheating Creek
Lake Okeechobee
Atlantic Ocean
Lake
Orange
Osceola
Brevard
Polk
Hillsborough
Indian River
Okeechobee
St. Lucie
Manatee
Hardee
Martin
Sarasota
De Soto
Highlands
Glades
Charlotte
Hendry
Lee
Collier
Palm Beach
Caloosahatchee River
This map is a conceptual tool utilized for project development only. This map is not self-executing or binding, and does not otherwise affect the interests of any persons including any vested rights or existing uses of real property and is not a survey.

Summary of Base Modeling Assumptions

- **Period simulation 1970-2005**
  - **Rainfall and ET data sources are consistent with those of South Florida Water Management Model**
- **Current Base (circa 2005)**
  - **Upper Kissimmee- Flow boundary conditions derived from Kissimmee River Restoration modeling**
  - **Lower Kissimmee- Phase I Kissimmee River Restoration in place**

Summary of Base Modeling Assumptions

Current Base (circa 2005) continued

- **Flow pass-through method used based on historical flow data for period of record from a sub-watershed into Lake Okeechobee for the following sub-watersheds:**
  - **Taylor Creek / Nubbin Slough**
  - **Lake Istokpoga**
  - **Fisheating Creek**
- **Lake Okeechobee-**
  - **WSE schedule**
  - **Demands on Lake derived from South Florida Water Management Model**

Summary of Base modeling assumptions

Future Base (circa 2015)

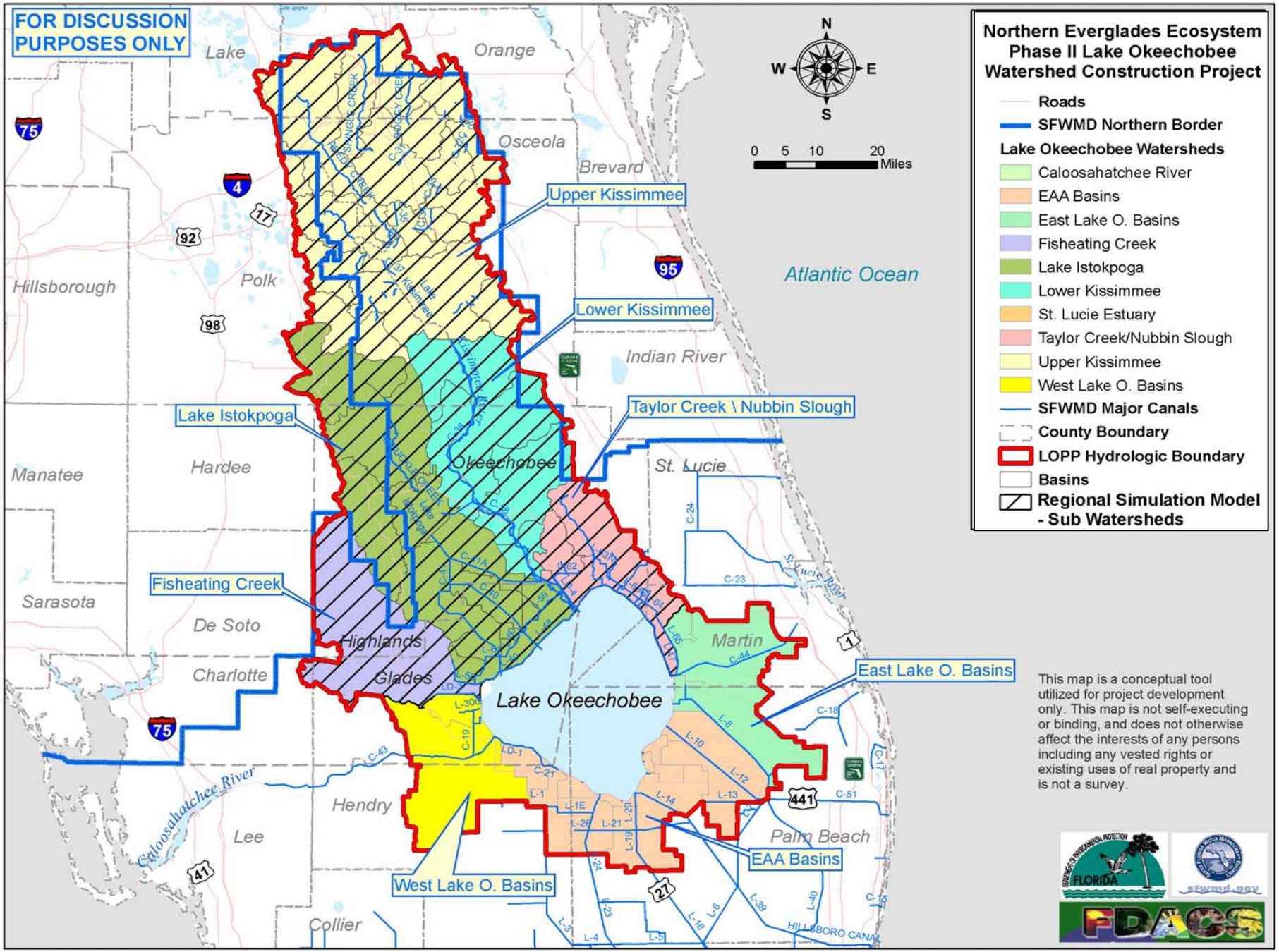
- Full Kissimmee River Restoration including headwaters revitalization schedules
- Lake Okeechobee Regulation Schedule- WSE
- SFWMM Model run establishing boundary conditions includes Acceler 8 Projects:
  - A-1 EAA Reservoir
  - C-43 Reservoir
  - C-44 Reservoir/STA
- Authorized MODWATERs and C-111 projects

Examples of Performance Measures for Water Quantity analysis

- **Lake Okeechobee**
  - **Extreme Low and High Lake**
  - **Lake Stage Envelope**
  - **Lake Minimum Water Levels**
- **Estuaries**
  - **High/Low Discharge Criteria**
  - **Salinity Envelop Criteria**
- **Kissimmee River**
  - **Comparison with Pre-Channelization Seasonal Flow Distribution**
- **Water Supply**
  - **EAA and LOSA water supply cutbacks**

Water Quality Analysis

- **Spreadsheet analysis process**
  - **Period of record: 1991- 2005**
  - **Phosphorus reduction for each management measure estimated based upon best available information**
  - **Phosphorus reductions applied on a sub-watershed basis (9 sub-watersheds)**
  - **Shows incremental progress toward meeting Lake Okeechobee Total Maximum Daily Load**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Alternative 1

Alternative 1 Summary

- **Alternative 1 includes-**
  - **Level 1, 2, and 3 Management Measures**
  - **CERP Lake Okeechobee Watershed Project Tentatively Selected Plan features not in Levels 1-3**
    - **Kissimmee Reservoir**
    - **Istokpoga Reservoir**
    - **Istokpoga STA**

Alternative 1 Management Measures

- **Management measures applied throughout Lake Okeechobee Watershed**
  - **Source Control- Agricultural and Urban**
  - **Lake Okeechobee Works of the District**
  - **Lake Okeechobee and Estuary Watershed Basin Rules/Environmental Resources Permitting**
  - **Alternative water storage options**
- **Lower Kissimmee Sub Watershed- reservoir, ASR**
- **Taylor Creek/Nubbin Slough Sub Watershed- reservoir, ASR, STAs, water quality projects, stormwater facilities**
- **Lake Istokpoga Sub Watershed- reservoirs, ASR, STAs**

Alternative 1
Water Budget Analysis-
Regional Simulation Model

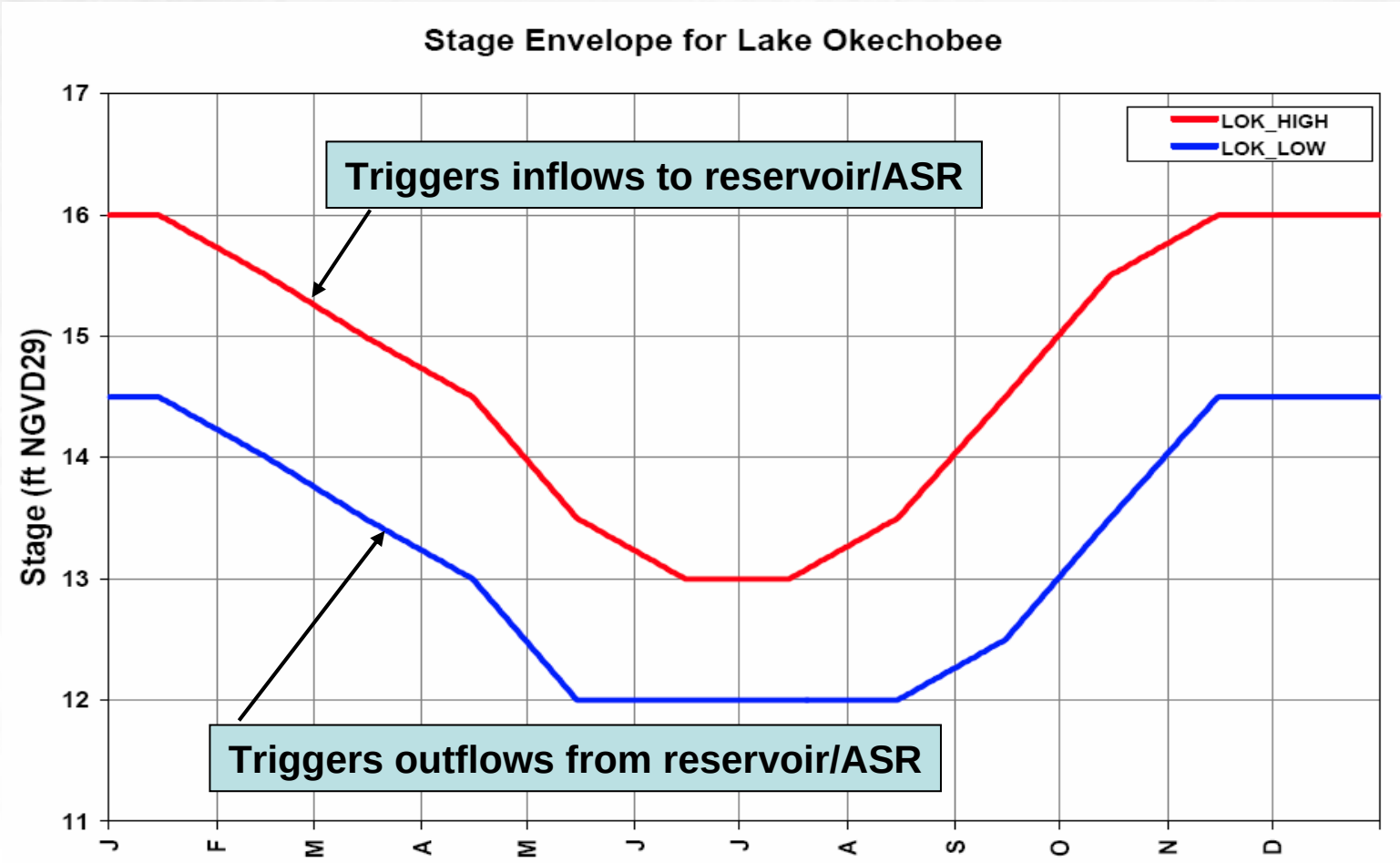
Management Measures included in water budget modeling of Alternative 1

- **Taylor Creek/Nubbin Slough Sub-Watershed**
  - **#16: Lakeside Ranch STA**
  - **#17: Lemkin Creek STA**
  - **#19: Taylor Creek ASR**
  - **#23: Taylor Creek Reservoir**
  - **#24: Brady Ranch STA**
  - **#99: Taylor Creek STA (Critical Project)**
  - **#100: Nubbin Slough STAs (Critical Project)**

- **Lower Kissimmee Sub-Watershed**
  - **#26: Paradise Run ASR**
  - **#29: Kissimmee Reservoir (LOWP)**
  - **#93: Kissimmee River ASR**

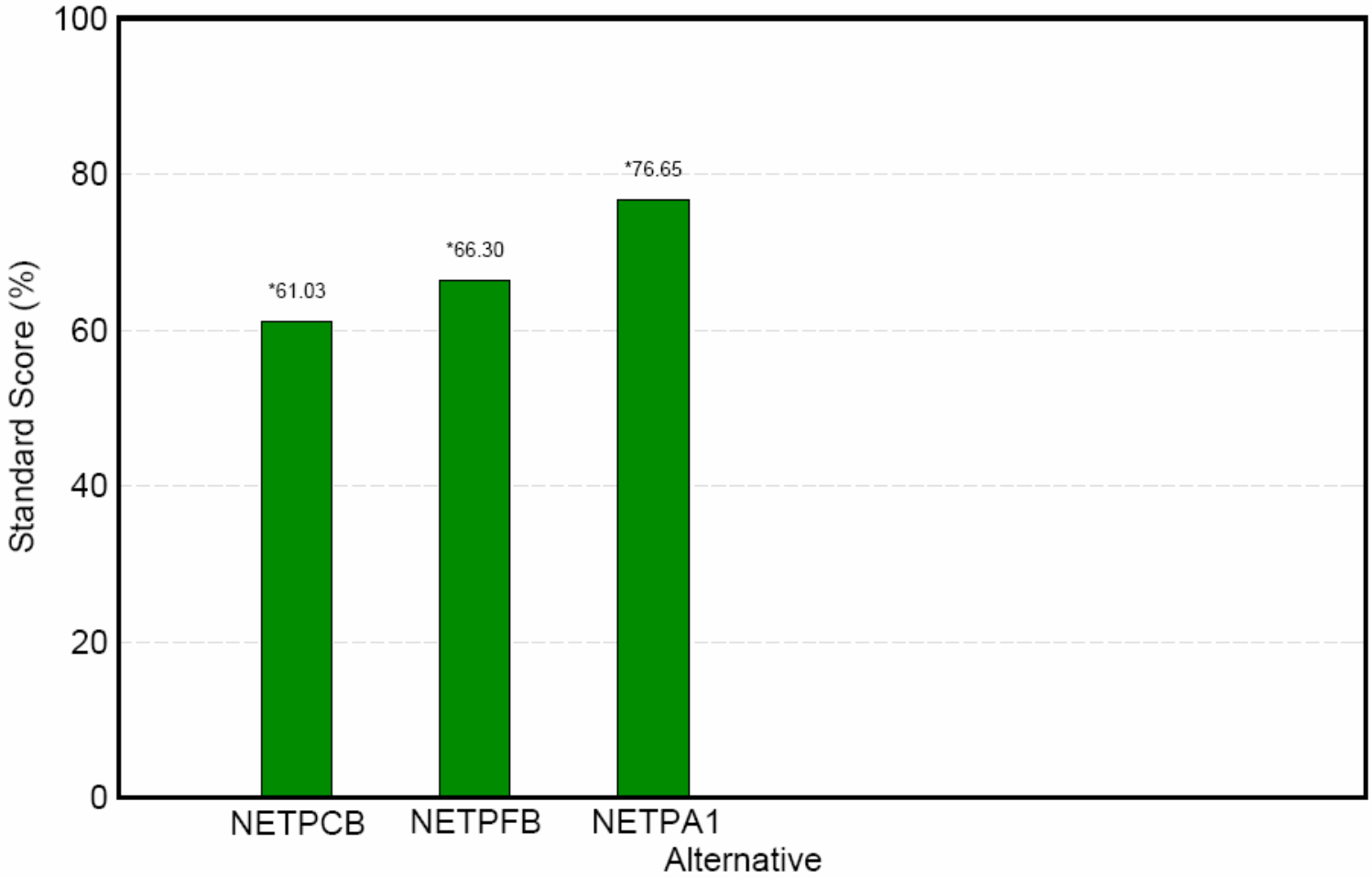
- **Istokpoga/Indian Prairie Sub-Watershed**
  - **#18: Seminole Brighton Reservation ASR**
  - **#30: Istokpoga Reservoir (LOWP)**
  - **#31: Istokpoga STA**

Regional Trigger For Inflows/Outflows Through Reservoir and ASR Management Measures in Alternative 1



Lake Okeechobee Stage Envelope

Score Below Envelope - Weekly Calculation (1970-2005)



*Note: A score of 0% is the worst score. The stage falls below the envelope by 1 ft or more on average.
A score of 100% is the best score. The stage never falls below the envelope.

For Planning Purposes Only
Run Date: Wed Aug 29 14:23:30 2007
Regional Simulation Model (RSM)
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Filename: lo3_weekly_low_annualized.agr

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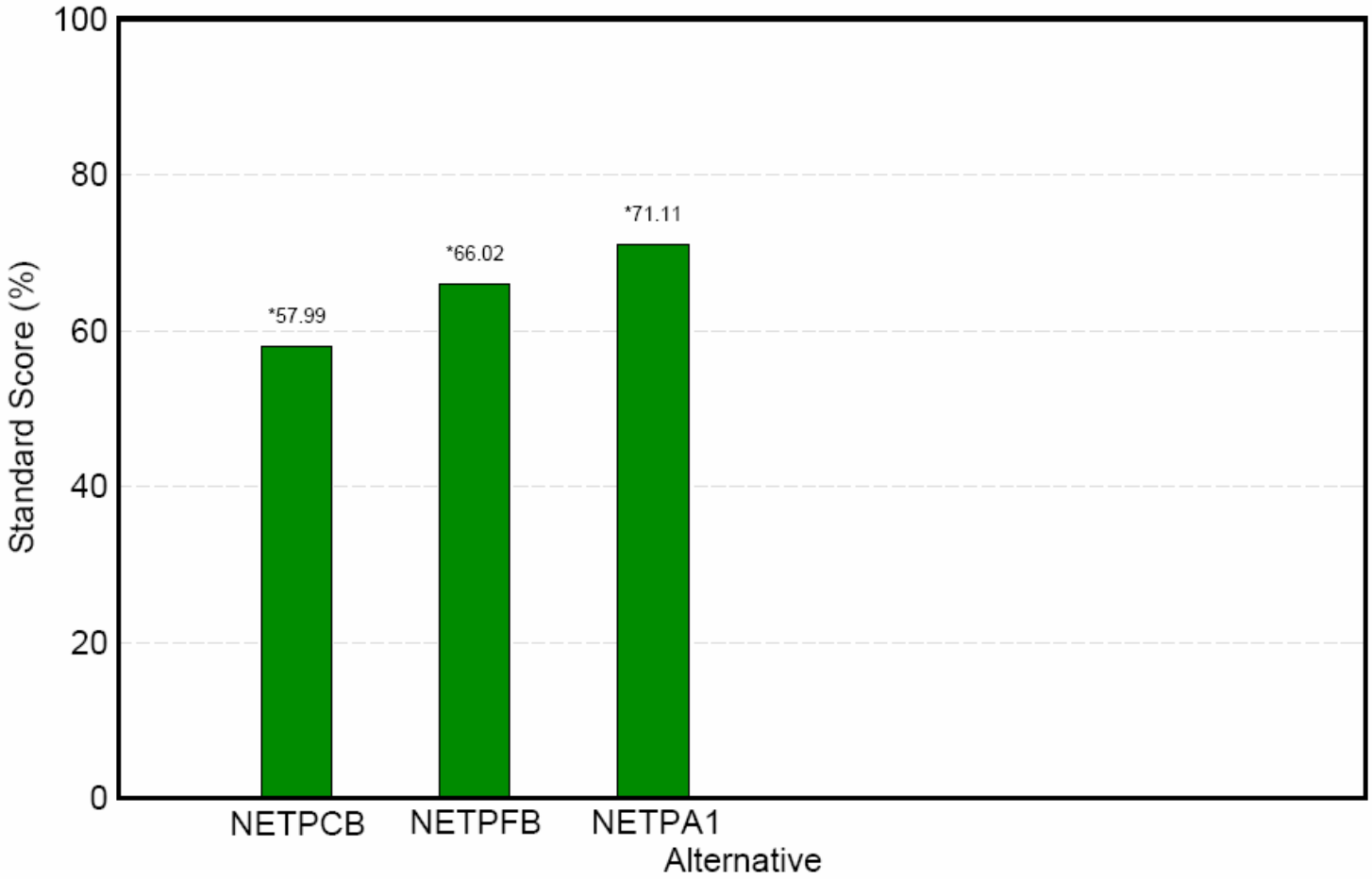

*Note: A score of 0% is the worst score. The stage exceeds the envelope by 1 ft or more on average.
A score of 100% is the best score. The stage never exceeds the envelope.

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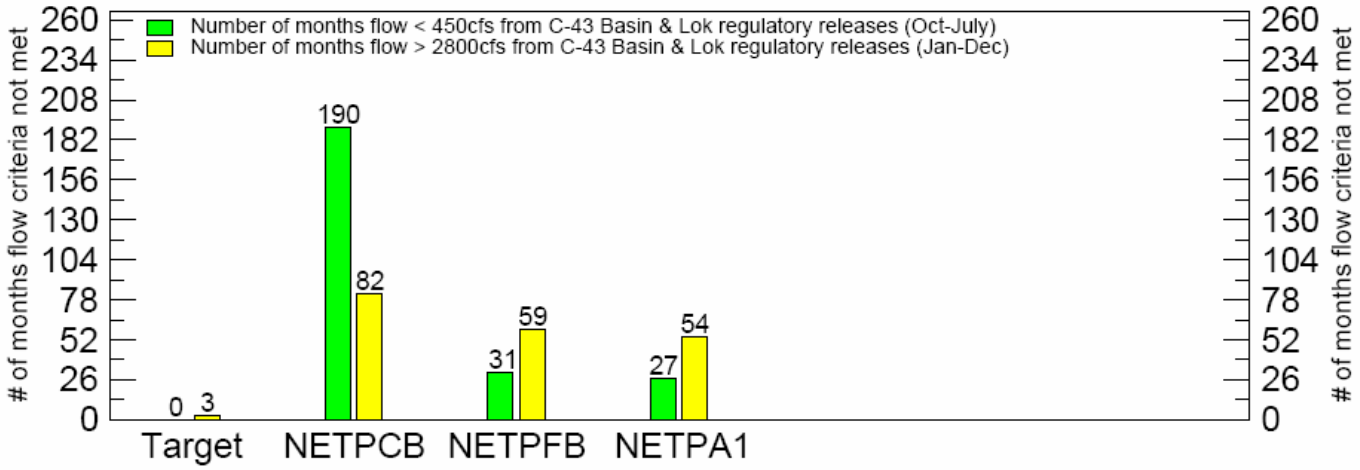
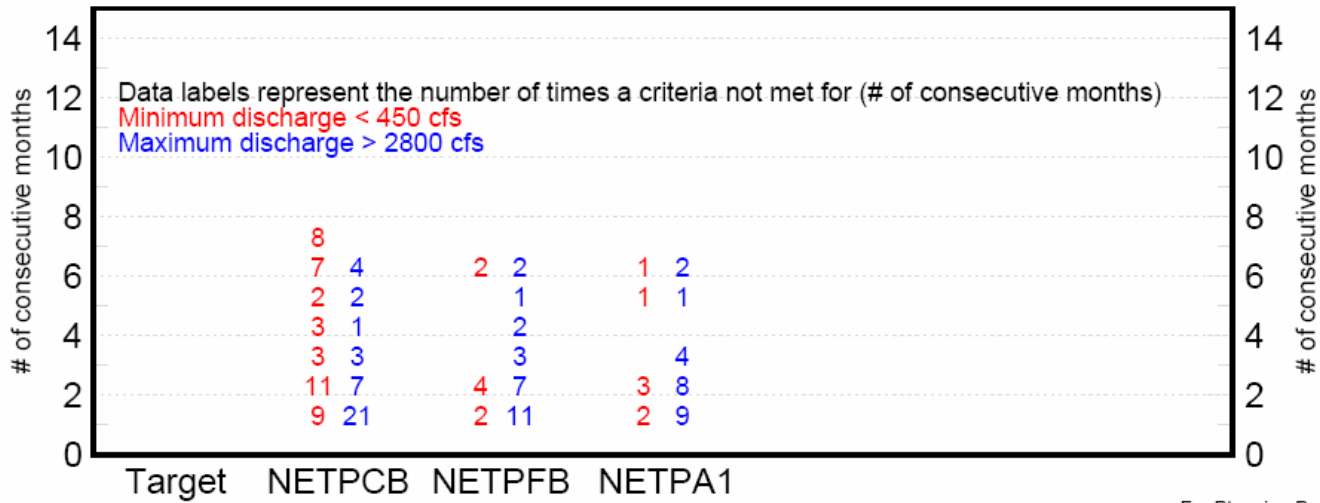
Number of Times Salinity Envelope Criteria NOT Met for the Caloosahatchee Estuary (mean monthly flows 1970 - 2005)





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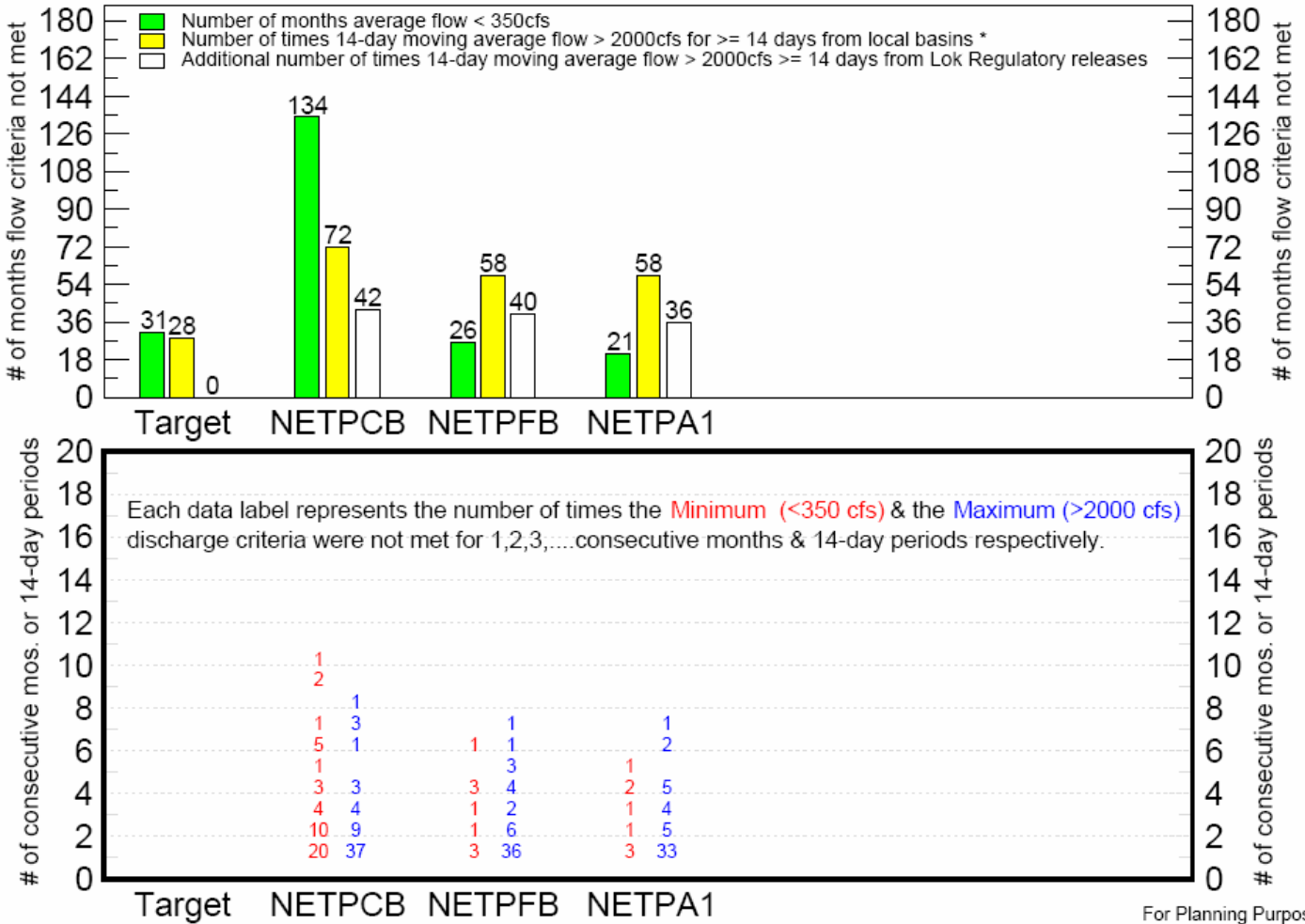
Number of times Salinity Envelope Criteria NOT Met for the St. Lucie Estuary (mean monthly flows 1970 - 2005)



For Planning Purposes Only
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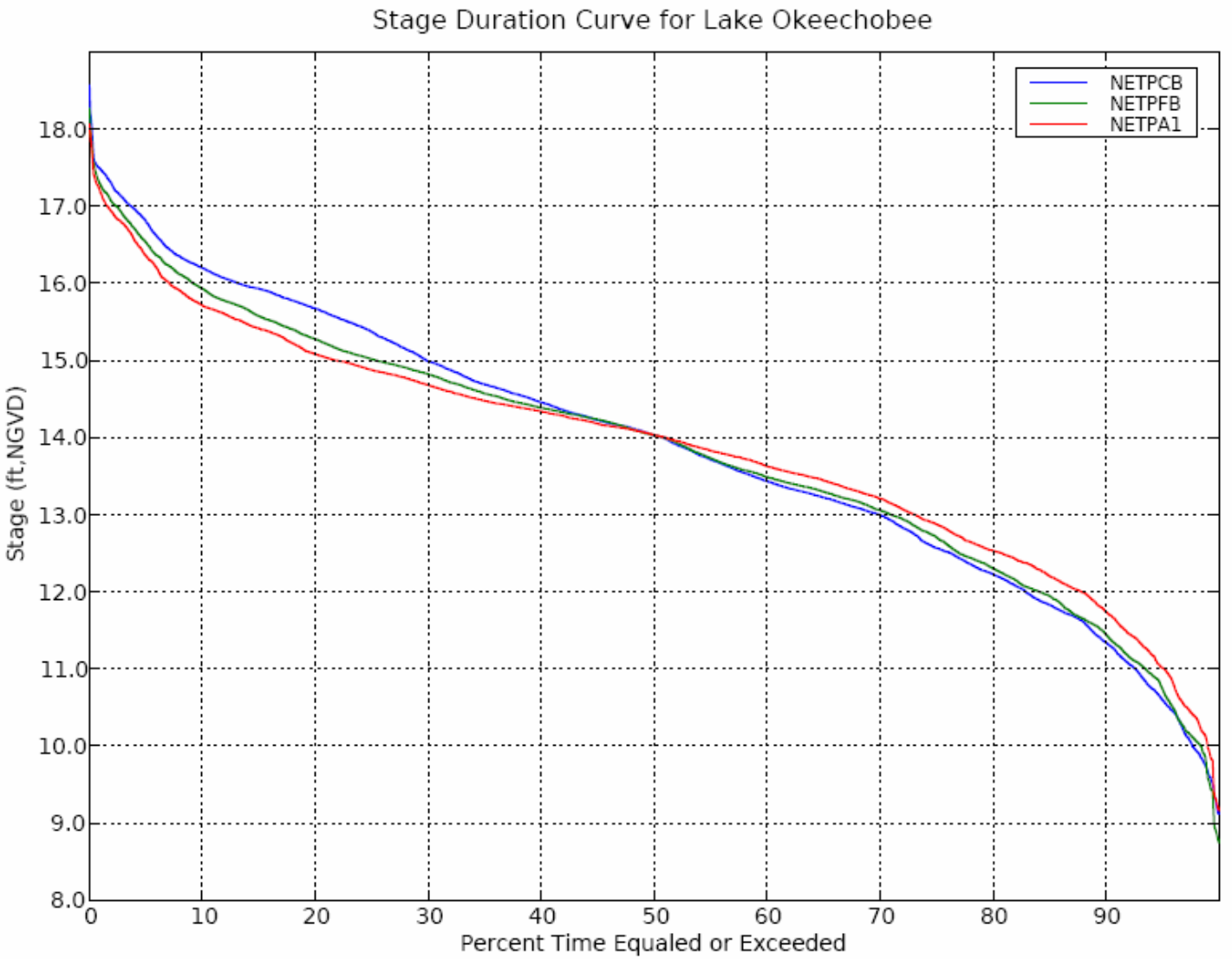
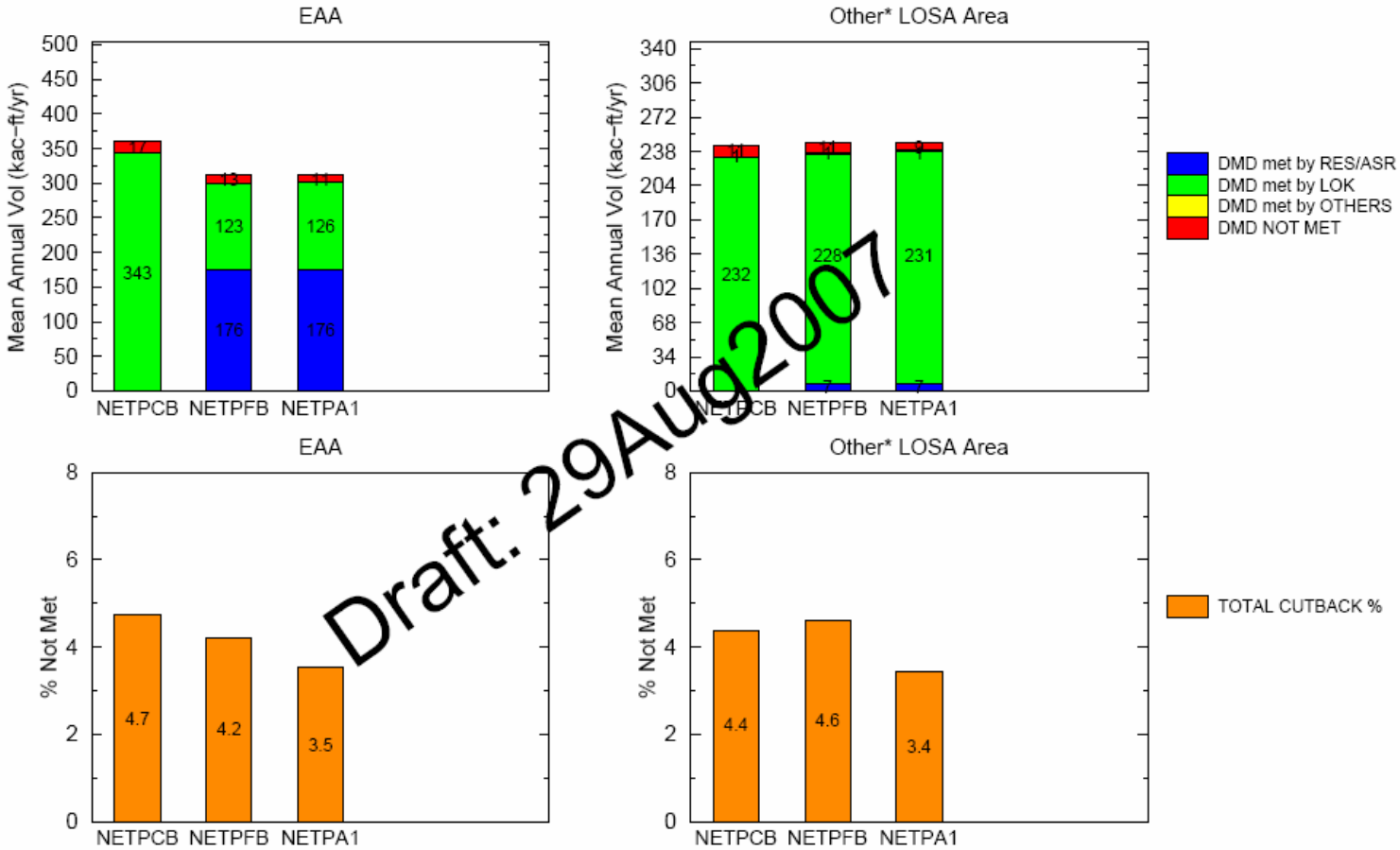
Stage Duration Curve for Lake Okeechobee



Mean Annual EAA/LOSA Supplemental Irrigation: Demands & Demands Not Met for 1970 – 2005



Draft: 29Aug2007

Other LOSA Areas: S236, S4, L8, C43, C44, North & Northeast Lakeshore, & Lower Istokpoga

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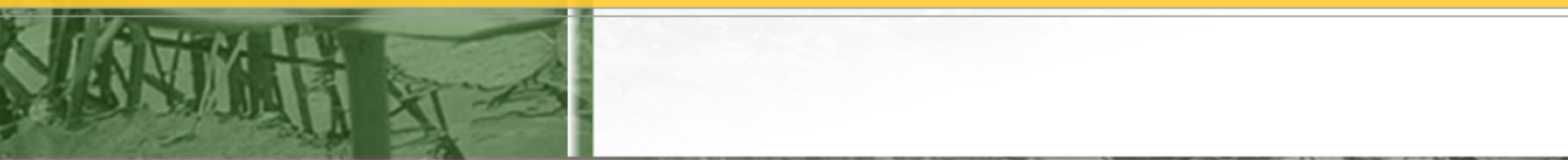
Regional Simulation Model (RSM)

Filename: losa_dmd_4in1.fig

Alternative 1 Water Quality Analysis



Summary of Phosphorus Loading with Alternative 1

Initial Annual Average P Load	**514 mt**
TMDL Allocation	**-105 mt**
Remaining Load	**409 mt**
Load reduction from Level 1 and 2 Management Measures	**-239 mt**
Load reduction from Alt 1	**-48 mt**
Remaining Load To Be Addressed	**122 mt**

Next Steps in Formulation Process

- **Develop and analyze storage alternative**
- **Develop and analyze water quality alternative**
- **Integrate storage and water quality analysis**

Rivers Watershed Protection Plan Process

- **Project managers for District**
  - **Janet Starnes- Caloosahatchee River Watershed Protection Plan**
  - **Mike Voich- St. Lucie River Watershed Protection Plan**
- **Expanding Interagency Group to help coordinate planning**
- **Identifying the District team and developing work plan**
- **Formally kick-off in October**


Questions